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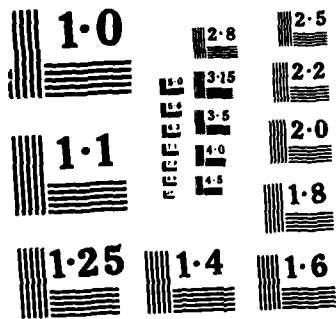
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FINAL REPORT OF
AD HOC PANEL ON
ARMY UTILIZATION OF SPACE ASSETS

DECEMBER 1984

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REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM	
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER	
AD-A163391			
4. TITLE (and Subtitle)		5. TYPE OF REPORT & PERIOD COVERED	
Army Science Board (ASB) Final Report of Ad Hoc Panel on Army Utilization of Space Assets		Final - 1983-1984	
		6. PERFORMING ORG. REPORT NUMBER	
7. AUTHOR(s)		8. CONTRACT OR GRANT NUMBER(s)	
Mr. Lawrence H. O'Neill, Chair Mr. Gilbert F. Decker Dr. Lawrence J. Delaney (cont'd on reverse)			
9. PERFORMING ORGANIZATION NAME AND ADDRESS		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS	
Army Science Board OASA(RDA) Washington, DC 20310-0103			
11. CONTROLLING OFFICE NAME AND ADDRESS		12. REPORT DATE	
Army Science Board OASA(RDA) Washington, DC 20310-0103		December 1983	
		13. NUMBER OF PAGES	
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)		15. SECURITY CLASS. (of this report)	
		UNCLASSIFIED	
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE	
		N/A	
16. DISTRIBUTION STATEMENT (of this Report)			
Approved for public release; distribution is unlimited.			
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)			
18. SUPPLEMENTARY NOTES			
19. KEY WORDS (Continue on reverse side if necessary and identify by block number)			
20. ABSTRACT (Continue on reverse side if necessary and identify by block number)			
<p>This report represents the conclusions, recommendations, and a very brief synopsis of the supporting discussion of an ad hoc working group established in March 1983, to consider the subject of Army utilization of space assets. The panel concluded that the Army's approach to space utilization is not commensurate with the potential benefit of such utilization. The group has concluded that space as a place for platforms, and space technology itself, offer realistic prospects of providing the Army with substantial improvements in communications, position location, determining the battlefield environment and</p>			

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Dr. David D. Elliott
Mr. Stephen W. Leibholz
Mr. David Shore
Dr. Louis W. Tordella
Dr. Nicholas Yaru
Mr. A. Thomas Young

Item 20. Abstract (cont'd)

most importantly, the ability to see deep into the enemy's territory for intelligence and targeting purposes.

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REPORT OF THE ARMY SCIENCE BOARD
AD HOC PANEL ON
THE ARMY'S UTILIZATION OF SPACE ASSETS

I. REPORT

This report represents the conclusions, recommendations, and a very brief synopsis of the supporting discussion of an ad hoc working group established in March 1983, to consider the subject of Army utilization of space assets. In its work, the group received briefings on a substantial number of national systems, and discussed the applicability of spaced-based systems to significant Army requirements. There was substantial background in the group concerning national and other systems and reasonable familiarity with current and evolving Army doctrine. In discussion, emphasis was placed on the needs of commanders of corps and divisions.

In essence, the group has concluded that the Army has performed very well in deriving valuable support for its ability to discharge certain assigned missions by the skillful use of modest budgets, recognizing, however, that the Army is only a (minor) user of available systems, and does not have a great deal of influence in the design and operation of the systems. This raises the two questions of whether or not these systems can always be relied upon to be available to support the Army's tactical needs in times of stress or conflict, and secondly, if the Army were a larger player, might systems be designed and/or fielded in sufficient density to meet Army needs more fully.

As matters stand today, the Army's approach to space utilization is not commensurate with the potential benefit of such utilization. The group has concluded that space as a place for platforms, and space technology itself, offer realistic prospects of providing the Army with substantial improvements in communications, position location, determining the battlefield environment and, most importantly, the ability to see deep into an enemy's territory for intelligence and targeting purposes.

Effective pursuit of this prospect requires a substantial commitment by the Army of money, people and facilities. In order to evaluate proposals for increased exploitation of space technology, the Army must provide for advocacy of such exploitation within its budget. This will require a high level statement of commitment to admit space exploitation into full candidacy for tangible Army support against other demands for Army resources. Resources adequate to support effective advocacy of space technology must be sufficient to all sound planning for the implementation of space technology in systems. Such planning

requires the assessment of officers of appropriate rank and organizational positions to the planning task.

In any case, the Army is certain to benefit from competent and effective advocacy of applying space technology to support its missions. Accordingly, the working group recommends that the Army establish a structure to assure such effective advocacy. Further, the Army must declare itself willing to give consideration to those allocations of resources proposed by its own advocates of using space technology more completely than the Army now does or plans to do.

The central conclusions of the working group are:

1. Space technology can bring substantial support to important Army missions.
2. There is a clear need for reconsideration of current Army space policy at the top levels of DA civilian management and Army military command.
3. There is a clear need for formal promulgation of an updated Army space policy.
4. There is a clear need for the Army to provide within itself expert ability on an adequate level of authority and scale to identify, evaluate and advocate exploitation of space to meet Army tactical requirements.

In light of its conclusions, the working group recommends:

1. That the Secretary and Chief of Staff of the Army develop and announce an Army Space Policy designed to serve the tactical needs of the Army.
2. That appropriate officers and civilian officials of the Department of the Army be directed to develop a plan to implement the updated Army Space Policy.
3. That an officer with a position on the Army Staff, of sufficient rank and authority to make things happen, be directed and authorized to serve as the person responsible for day-to-day direction of Army participation in space activities.
4. That the Army establish career incentives for its officers to become experts in the definition, acquisition and operation of space systems, and to practice such expert abilities together with different, traditional Army skills.

The essence of an Army Space Policy advocated by the working group is:

The Army will accept into full candidacy for support by personnel, funds, and facilities any space system that can be shown to offer significant advantages to Army missions, and the Army will take the steps needed to assure that such full candidacy be expertly supported.

The working group does not wish to convey an impression that favors a "parochial" space policy for the Army. It does not suggest who should "own and operate" space systems that serve the Army. It does emphasize its belief that the Army can benefit greatly from space systems but can be well served only by systems which are assuredly available to serve the operational needs of corps and division commanders. To obtain the service of such systems will require, in the working group's opinion, substantial participation by the Army in the setting of operational requirements, establishing technical specifications and funding acquisition and operation. One source of the working group's belief is that where critical Army participation has been evident, e.g., in the TENCAP program, tremendous support to our field elements has occurred and is further evolving.* Assuring Army ability to participate in this way is the main objective of the working group in proposing that the Army open good career opportunities to space experts among its officers.

The working group also wishes to make clear its belief that Army use of space systems may or may not result in duplication of capabilities obtainable in other ways. In particular, space-based systems may provide capabilities alternatively realizable through the use of aircraft or Remotely Piloted Vehicles (RPV's).

The group believes that the Army should choose platforms from among the possible space and air-supported vehicles giving appropriate weight to basic technical factors (e.g., distance to the observable horizon), acquisition and operating costs, and importantly, survivability. The group estimates that some very important capabilities can only be based in space. It also believes that costs of operationally equivalent air-supported systems are likely to be as large as those of space-based systems. Finally, the group believes that the complicating of an enemy force's burden in destroying systems by including space-based assets among them should be given appreciable weight by the Army.

*The success of TENCAP should not reinforce the policy of very limited commitment. There are important opportunities that even a top performer like Army TENCAP cannot exploit because of limited resources.

II. PEOPLE

In the judgement of the working group, it is pointless for the Army to consider the military worth of assuring a larger role in the exploitation of space technology unless it is prepared to offer satisfying, rewarding careers to officers who desire to become experts in the technology and operational application of that technology. The group has neither the qualifications nor the inclination to challenge the wisdom of the policy that emphasizes the fundamental requirement that any officer possess broadly applicable command ability in combat, combat support, combat service support and general management. It does believe, however, that providing career incentives to develop and maintain specialized expert capability applicable to the performance of its assigned missions is in the best interest of the Army. The group urges that appropriately qualified officers be encouraged and enabled, in adequate numbers, to become space experts as well as sound military commanders.

It is, of course, difficult to be specific about the number of such careers that should be opened up to Army officers. At present, there may be about 100 officers of the Army who are assigned to jobs related to space. Many of these officers are not technical or operational experts.

This number and this fact lead to an estimate in the working group that starting about 20 new space specialist careers each year is reasonable. The group estimates that a suitable Army goal would be to develop a pool of about 500 officer experts in space technology and operations. At any time, about half of the pool should be assigned to jobs involving space systems and the remainder should be given more conventional command assignments.

The working group believes that the personnel policy briefly presented above cannot be made to work unless the Army establishes a chief space officer on the Army Staff. The duties of such an officer would be to serve as a point of contact for officers and units with space-related roles, to be the source of authoritative information for the Chief of Staff and other senior Army officers, to be the advocate of applications of space technology for the benefit of the Army, and to give direction and leadership to the Army's officer space experts.

III. SYSTEMS

The group was briefed on a number of space systems in the development or in a conceptual stage, and many of our members have familiarity with space systems from other of their activities. We attempted in our discussions to relate the capabilities of these systems, and of evolving space technology, to various Army missions, while also being alert to the limitations of space systems. The trade-off between cost and revisit time, for

example, is a major one for surveillance systems. It was clear that there are several important applications which have the potential for adding significantly to the Army's ability to conduct difficult missions.

We weighed the advisability of including detailed analysis of Army utilization of space systems in this report and concluded that doing so is inadvisable for reasons given later in this section. It is desirable to state briefly, for purposes of illustration, a few aspects of exploiting space for Army needs. Specifically:

Reconnaissance and Intelligence Deep in Enemy Territory

Location of enemy command centers, recognizing and tracking enemy forces, and numerous other functions must be accomplished at unprecedentedly large distances if new and developing Army combat doctrine (including integrated operations with the Air Force) is to achieve practicality. Such deep seeing can, of course, be done with aircraft. However, it is very doubtful that adequate coverage, timeliness and acceptable loss rates could be achieved and sustained. Moreover, current space systems are not designed appropriately to furnish Air-Land combat commanders with needed, timely information. New systems are unlikely to do so unless the Army's influence on new system design and acquisition is substantially increased.

Communications Beyond Line-of-sight

It seems to be certain that under new doctrine, small, lean Army forces will need to operate deep in enemy territory and will need to communicate with higher echelon commanders. Such forces will also need to know accurately their own locations. This implies that small, practical, reliable, man-carryable communication and position locating systems will be needed. Indeed, necessary exploitation of very "smart" devices using very modern dense (i.e., small) solid state devices may require transmission to and from satellites in order to achieve needed "bandwidths," i.e., information channel capacities.

Combat Environment

Such "simple" but crucial combat relevant information as close cover and soil trafficability cannot be reliably furnished at present in many plausible conflict situations. Such information may be obtained by sending people to observe and communicate what they observe or by conceivable improvements in current environmental sensing satellite systems. In either case, it seems clear that the Army has a significant need to play a strong role in the design and acquisition of satellite systems.

Beyond the brief summary illustrations above, the group decided against detailed assessment of the contributions to the Army capability that space systems could make for two reasons:

1. At the broad level of our review, the utility of space to the Army is essentially self-evident. The practicality and costs of such utilization upon which further action will depend, will require a detailed assessment, an assessment that we strongly urge the Army to undertake.
2. Classification. A discussion of systems and technology would require that this report be classified; yet the primary issues at this time center on questions of policy and personnel. To facilitate an open discussion of this matter, we believe the systems and technology issues should be dealt with separately. To the extent our panel can help at that stage, we stand prepared to do so.

APPENDIX A

Meetings of Ad Hoc Working Group

15 March 1983 -
U. S. Military Academy, West Point, N.Y.

8 April 1983 -
Pentagon, Washington, D.C.

12-13 May 1983 -
Pentagon, Washington, D.C.

20-21 September 1983 -
Pentagon, Washington, D.C.

14-15 November 1983 -
Pentagon, Washington, D.C.

18-19 January 1984 -
Arlington Hall Station, Arlington Va.

28-29 February 1984 -
Pentagon, Washington, D.C.

APPENDIX B

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APPENDIX C

On the following page, the terms of reference
for the group are presented.



DEPARTMENT OF THE ARMY
OFFICE OF THE ASSISTANT SECRETARY
WASHINGTON, DC 20310

3 MAR 1983

Dr. Richard A. Montgomery
Director, Tactical Division
R&D Associates
4640 Admiralty Way
Marina del Rey, California 90291

Dear Dr. Montgomery:

Please appoint an Army Science Board Ad Hoc Panel of about 5-8 members to conduct a study on the Army Utilization of Space Assets to support Army tactical commanders.

Presently, the Army is a user of space systems as opposed to an owner or operator. The Army's influence in the design, planning and operation of space-based systems is limited. Owing to this circumstance, the Army may not be fully exploiting space to its best advantage.

Accordingly, the ASB should examine the capabilities of currently available and future space assets to enhance the Army's ability to carry out its mission. Included should be functional support provided to communications, meteorology, mapping and geodesy, position location, and target acquisition. In the examination, consider whether the Army is adequately exploiting space assets, how the needs of tactical commanders can be met by the use of space assets, and the adequacy of the battlefield survivability of space-based systems employed by the Army.

The panel should begin work this Spring, and prepare a draft final report by November 1983.

MG Robert L. Schweitzer, ODCSOPS, is the sponsor of this effort. Dr. Richard Haley, Assistant Deputy for Science and Technology, DARCOM, and BG James Cercy, Deputy Director of Combat Support Systems, ODCSRDA, have agreed to serve as Senior Staff Advisors. LTC Allen Lewis (ODCSRDA) is the DA Staff Assistant. Dr. Mark Epstein, Deputy for C³ and Intelligence Systems, will serve as the Cognizant Deputy from my office.

Sincerely,

Amoretta M. Hoeber
Principal Deputy Assistant Secretary of the Army
(Research, Development and Acquisition)

APPENDIX D

BRIEFING CHARTS

ARMY SCIENCE BOARD

Ad Hoc Working Group

ARMY UTILIZATION OF SPACE ASSETS

TERMS OF REFERENCE

- Army is a user, not an owner

-
- Consider capabilities of present and future space assets to enhance Army ability to do its job

- Functional support to needs of Tactical Commanders

Communications

Meteorology

Mapping/Geodesy

Position Location

Target Acquisition

TERMS OF REFERENCE

Is Army using space adequately to support tactical commanders ?

How can their needs be met by using space assets ?

Survivability ?

WORK SCHEDULE

9 members plus 3 or 4 Army briefers/advisors

12 meeting days, March, 1983 to February 1984

Report Preparation and Review

PARTICIPANTS

Gilbert Decker, TRW

Larry Delaney, SAI

David Elliott, SRI

Stephen Leibholz, Analytics, Inc.

Lawrence O'Neill, RRI, Chair.

David Shore, RCA

Louis Tordella, Consultant

Nicholas Yaru, Hughes

Thomas Young, Martin Marietta

LTC Allen Lewis, ASPO/DCSRDA

MAJOR SOURCES/ADVISERS

National Programs

ASPO

DCSOPS

DCSRDA

ACSI

AMC/DARCOM

TRADOC

INSCOM

CONCLUSIONS

Potential benefit to Army of space technology is great

**There is no adequate way for space options to be skillfully
advocated in Army**

**Army should reconsider, update and promulgate its
space policy**

RECOMMENDATIONS

SA and CSA develop and announce Army space policy
designed to help corps and divisions commanders

Army develop plan to implement policy

Establish officer on ARstaff to direct day by day army
participation in space

Army establish incentives for its people to be space experts
in addition to more traditional qualifications

ESSENCE:

“The Army will accept into full candidacy for support by personnel, funds, and facilities any space system that can be shown to offer significant advantages to Army missions, and the Army will take the steps needed to assure that such full candidacy be expertly supported.”

COMMENTS

Working group does not favor "Parochial" approach

Group believes space system will be available to corps and divisions only if Army is "In" early and substantially in system planning and acquisition

Group believes ARMY/TENCAP is first rate but Army forecloses important possibilities at level of budget and personnel commitment represented by TENCAP

COMMENTS

Space is sometimes but not always the "only way to go"

Important for Army to be sure space approaches are
advocated as authoritatively as alternatives

Costs

Survivability

MAIN COMMENT

PEOPLE !

SYSTEMS

Reconnaissance and Intelligence Deep in Hostile Territory

Communications beyond LOS

Combat environment

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Commander, Eighth US Army, APO SF 96301	5
Commander, Western Command, Fort Shafter, HI 96858	5
Commander-in-Chief, US Army Europe, APO NY 09403	5

OTHER

Director, CIA, Washington, DC 20505	1
Executive Director, Board on Science & Technology (BAST), 2101 Constitution Ave., Wash., DC 20418	1

END

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